

SUPPLEMENTARY NOTES ON THE *COCCIDÆ* OF CEYLON.

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PART III.

(With Plates H—K.)

Since the earlier appearance of my "Supplementary Notes" in this Journal (Vol. XIII, Nos. 1 and 2), a fresh mass of material has been accumulated, necessitating a further series descriptive of new species of *Dispilineæ* from Ceylon. Nor can it be supposed that the supply is yet exhausted, although the original number of species recorded in my monograph has now been more than doubled. Large areas of the Island still remain unexplored (as regards *Coccidæ*) and new species are frequently discovered even in the best worked localities, as may be seen from the frequency with which the name "Peradeniya" appears in the following pages.

Genus ASPIDIOTUS.

ASPIDIOTUS LONGISPINUS, Morgan. (Pl. H, fig. 1.)*Aspidiotus longispina*, Morg., Ent. Mo. Mag., XXV., p. 352.*Morganella longispinus*, Ckll., Bull. 6, Dep. Agric. (1897).*Hemiberlesia longispinus*, Leon., Riv. Pat. Veg., vi. (1897).*Morganella maskelli*, Ckll., Bull. 6, Dep. Agric., p. 22 (1897).

♀ Puparium black, circular, moderately convex, dense and usually more or less obscured by fragments of bark. Diameter 1.10 mm.

♂ Puparium not observed.

Adult ♀ subcircular, the pygidium only slightly projecting beyond the general curve. Colour whitish; the chitinous parts stained a deep brown. Pygidium (fig. 1) with two rather narrow prominent convergent median lobes almost or quite contiguous. Margin on each side fringed with numerous narrow elongate squames, some of them deeply fimbriate, others obscurely so. Spines deep black, stout, long and whip-like, projecting far beyond the squames. No circumgenital glands. In all my examples the terminal half of the pygidium is densely chitinous and deep coloured, obscuring all pores and other characters. Diameter 0.50 to 1 mm.

Adult ♂ unknown.

Habitat.—In Ceylon, beneath loose bark on stems of the "Jak" tree (*Artocarpus integrifolia*). The scales are frequently embedded in the loose tissues of the cortex. (Peradeniya.)

ASPIDIOTUS CUCULUS, n. sp. (Pl. H, figs. 2, 3.)

♀ Puparium very irregular in form, due to the fact that it has to accommodate itself to the cavity which it inhabits. This cavity is of a conical shape and may contain as many as five of the insects, the puparia being then crowded and pressed together, elongated in the direction of the duct of the gall. Colour dull brown, usually comprising portions of the pellicle and derm of the former occupant. It is difficult to isolate a single individual for purposes of measurement, but the united mass has a length of about 2 mm.

♂ Puparium not observed.

Adult ♀ (fig. 2) white or pale yellow. Long pyriform. Pygidium terminating in two stout obscurely emarginate lobes; the margin for a short distance beyond them thickened and irregular (fig. 3). Two groups of about six long stout spiniform squames on each side of lobes, divided by a small marginal prominence. A larger conical point immediately beyond the outer group. Anal orifice small. Dorsal pores very minute and inconspicuous. No circumgenital or parastigmatic glands. Length 1 to 1.25 mm. Breadth 0.75 to 0.85 mm.

Adult ♂ not observed.

Habitat.—Female insects occupying the galls of another Coccid (*Amorphococcus mesuæ*), after that insect has died, whether on account of the intrusion or from natural causes, I have as yet been unable to determine.

ASPIDIOTUS (CHRYSOMPHALUS) PEDRONIS, n. sp. (Pl. H, fig 4.)

Puparium clear brownish straw-colour; pellicles paler, circular, flattish. Diameter 2.50 mm.

♂ Puparium not observed.

Adult ♀ broadly pyriform. Pygidium (fig. 4) with six prominent floriate lobes approximately equal in size. Interlobular squames narrow, deeply fimbriate, of same length as lobes. Three broad aciculate serrate squames beyond the outer lobe on each side. Circumgenital glands in five groups; median group with 1 or 2 pores; upper laterals 5 to 6; lower laterals about 6. Dorsal pores oval, moderately large and conspicuous, communicating with long trumpet-shaped ducts. Length 1.59 mm.

Adult ♂ not known.

Habitat.—On leaves of undetermined tree. Pedrotalagalla, at an elevation of about 8,000 feet. April.

Differs from *A. dictyospermi* in having the lobes of more equal size and in the much smaller and more ill-defined paraphyses.

ASPIDIOTUS (CHRYSOMPHALUS) MALLEOLUS, n. sp. (Pl. H, figs. 5, 6.)

♀ Puparium opaque snowy white; dense, broad and flat; irregularly deltoid. Pellicles pale straw-colour, usually marginal. Long diameter 4.50 to 5.50 mm.

♂ Puparium similar but very much smaller. Length 2.25 mm.

Adult ♀ (fig. 5) rather densely chitinous, elongate; cephalothoracic segment broadest, with a deep constriction behind; mesothoracic segment narrowest; segments well-defined, but margins not produced. Pygidium (fig. 6) with eight rather small but stout rounded lobes, their outer edges obscurely emarginate. Squames rather small but projecting beyond the lobes, not conspicuously fimbriate. Six large conspicuous clavate paraphyses and many smaller ones. Circumgenital glands numerous, in two curved groups. Median dorsal area of pygidium conspicuously reticulate (as in *A. trilobitiformis* and its allies). Length 1.75 to 2.25 mm.

Habitat.—On under surface of leaves of *Mimusops hexandra*. Elephant pass, N. P. March.

The specific name has been suggested by the hammer-like form of adult female.

ASPIDIOTUS (CHRYSOMPHALUS) CISTULOIDES, n. sp. (Pl. I, figs. 7, 8).

♀ Puparium (fig. 7) dull blackish-brown; broadly oval, somewhat pointed behind; the ventral scale dense and strongly developed, the hinder portion steeply up-tilted and projecting beyond the margin of the dorsal scale. Dorsal scale rather strongly convex; subconical; the pellicles placed on the summit, nearer the anterior extremity. Larval pellicle only exposed, reddish. Length 1.35 mm. Breadth about 1 mm.

♂ Puparium of same colour, but flattened, smaller and more elongate. Length 1.25 mm. Greatest breadth 0.75 mm.

Adult ♀ turbinate; a deep constriction separating the pro- and mesothorax and a less-marked constriction behind the meta-thorax. Derm rather densely chitinous. Margin of pygidium (fig. 8) strongly cristate. There are six lobes, with difficulty distinguishable from the other marginal prominences. Median pair bluntly conical, with slightly emarginate sides. Second and third pairs sharply conical, each with a denticle on outer margin. Second pair smallest; third pair largest.

Beyond the third lobe the margin is broken into strongly serrate prominences. Squames and spines small and inconspicuous. Four moderately developed elongate paraphyses on each side, and numerous smaller ones between them. Anal orifice small, elongate, distant from margin about three times its own length. Circumgenital glands consisting of a single small group (of from 2 to 4 orifices) on each side, and two or three isolated orifices between them forming a broken median group. Dorsal pores minute and inconspicuous. Length 1 to 1.10 mm.

Adult ♂ not observed.

Habitat.—Occurring sparsely on leaves of *Cinnamomum*. Peradeniya. January.

The peculiar form of the female puparium gives it the appearance of a small capsule resting on the leaf. In this particular it closely resembles a species from Java, on *Piper nigrum* (to be described later under the name of *A. capsulatus*.)

ASPIDIOTUS (CHRYSOMPHALUS) QUADRIGLAVATUS, n. sp. (Pl. I, fig. 9.)

♀ Puparium flat, subcircular, very dark chocolate-brown. Larval pellicle exposed, prominent, of same colour as the secretory area. Nymphal pellicle completely concealed. Diameter 3 mm.

♂ Puparium similar in colour and texture to that of ♀, but smaller and oblong. Length 2 mm. Breadth about 1 mm.

Adult ♀ dull pale purplish. Pygidium (fig. 9) with eight stout bluntly pointed lobes, their sides slightly emarginate: the second pair somewhat smaller than the others and situated close to the median lobes. Margin beyond the lobes thickened and cristate. There are four very large and conspicuous clubbed paraphyses and two smaller and simple—exterior to the others. Squames small and obscure. Dorsal pores small and inconspicuous. Circumgenital glands presumably in five groups, but forming together an almost continuous arch, difficult to separate into its component parts, narrowest in the middle and thickening at the extremities. Orifices numerous—75 to 100. Anal aperture minute. Greater diameter (longitudinal) 1.25 to 1.75 mm.

Adult ♂ not observed.

Habitat.—On upper surface of leaves of *Murraya exotica*. Peradeniya. July.

Both ♂ and ♀ puparia are very firmly attached to the leaf. It is difficult to remove them entire.

The puparia are scarcely distinguishable from those of *A. rossi*, but the exceptionally large paraphyses and the disposition of the circumgenital glands distinguish it from that or any other species of *Chrysomphalus*.

ASPIDIOTUS (AONIDIELLA) TAPROBANUS, n. sp. (Pl. I, fig. 10).

♀ Puparium pale, transparent, straw-colour : pellicles slightly darker. Flattish ; irregularly oval. Ventral scale thin and delicate, adhering to under surface of dorsal scale in such a manner as to leave a central channel. Greatest diameter 2 to 2.25 mm.

♂ Puparium smaller and paler : more elongate. Length 1.50 mm.

Adult ♀ yellow. Pyriform. Pygidium (fig. 10) with six prominent rounded floriate lobes of equal size. Squames broad and deeply fimbriate : the outermost three aciculate. Paraphyses small and inconspicuous, one at inner side of base of each lobe. No circumgenital glands. Pygidial characters very similar to those of *A. aurantii*, but ultra-lobular squames not bifid. Length 1 to 1.25 mm. Breadth about 0.75 mm.

Adult ♂ not observed.

Habitat.—On leaves of *Phyllanthus myrtifolius* : usually on upper surface. Peradeniya. May.

The species differs from *aurantii* in the simple form of the ultra-lobular squames. The derm is more delicate and never becomes densely chitinous : nor are the pygidium and abdominal parts withdrawn into the body as in *aurantii*.

ASPIDIOTUS (TARGIONIA) PHYLLANTHI, n. sp. (Pl. I, fig. 11).

♀ Puparium dull black, with a raised whitish disc on larval pellicle : moderately convex : more or less concealed beneath the corky outer bark. Diameter 1 to 1.25 mm.

♂ Puparium grayish, (a whitish bloom overlying the blackish secretory area). Pellicle very dark shining brown, with a raised whitish circle in centre. Length 1 mm.

Adult ♀ circular : the pygidium only slightly projecting, demarked from abdomen by a curved series of irregular thickened chitinous patches. No parastigmatic or circumgenital glands. Pygidium (fig. 11) with eight well-defined stout emarginate lobes, each with a conspicuous elongate paraphysis at its base. No pectinate squames. Dorsal pores small, circular. Diameter 0.60 to 0.70 mm.

Adult ♂ brownish orange : notal plates and scutellum paler : apodema castaneous. Form broad, depressed. Head small : ocelli black :

rudimentary eyes colourless, inconspicuous. Terminal joint of antenna with one knobbed hair at apex and two at side. Foot with four knobbed hairs. Wings ample, hyaline, slightly iridescent. Genital sheath very long and narrow, as long as or longer than abdomen: sharply pointed. Total length 0·75 mm.

Habitat.—On *Phyllanthus myrtifolius*. Peradeniya. February. Female insects on stems and twigs, more or less concealed beneath the outer layers of the bark. Male insects on both surfaces of the leaves.

The pygidial characters approach those of *A. tenebricosus*, Comstock, but differ in the form, number and arrangement of the paraphyses and in the absence of pectinate squames.

ASPIDIOTUS (CRYPTOPHYLLASPIS) OCCULTUS, var. ELONGATUS, n. var.
(Pl. I, figs. 12, 13).

Aspidiotus occultus, Green, Cocc. Ceylon, pt. 1, p. 56.

Cryptophyllaspis occultus, Ckll., Check List, Suppl., p. 396.

♀ Puparium consisting principally of a delicate film lining the cavity of the gall, the pellicles forming an operculum at its base.

The gall itself (fig. 12) is irregularly cylindrical, constricted towards the base, the ends often studded with irregular tubercles. Length of gall about 2 mm.

♂ Puparium not observed; but probably occupying shallow depressions on the surface of the leaf as in the type.

Adult ♀ elongate oval, abruptly constricted towards the base of the pygidium. Pygidium (fig. 13) with 6 prominent lobes. Median pair large and deeply coloured: others smaller and pointed. Squames extending beyond the lobes: stout, deeply fimbriate and furcate. Anal aperture elongate, narrow. No circumgenital glands. Length 1 mm. Greatest breadth 0·50 mm.

Adult ♂ not known.

The galls are massed on the under surface of leaves of *Grewia* sp.; the aperture opening on to the upper surface. Heneratgoda. Feb.

Differs from type in its elongate form and greater size: in the cylindrical (instead of globular) form of the gall: and in the position of the galls on under (instead of upper) surface of the leaf.

ASPIDIOTUS (CHRYSOMPHALUS) DICTYOSPERMI, Morg.

Ceylon examples are all of the variety *pinnulifera* (Mask.).

In addition to other food-plants mentioned, it occurs on *Opuntia cochinchinensis*. (Peradeniya. February.) The puparia on this plant are almost white.

ASPIDIOTUS TRILOBITIFORMIS, Green.

Occurs also on *Ixora coccinia*. (Peradeniya, February.)

ODONASPIS PENICILLATA. n. s.p. (Pl. I, figs. 14 to 16.)

♀ Puparium (fig. 14) very pale fulvous: pellicles orange, usually concealed beneath the whitish secretion, situate at anterior extremity. Very firm and compact, the ventral scale as dense as the dorsal; the two scales so firmly adherent that it is difficult to extract the insect uninjured. Elongate: broadest immediately behind the pellicles: tapering posteriorly: flattened beneath; strongly convex in front, depressed towards hinder extremity. Length 1.50 to 2 mm. Greatest breadth 1 to 1.10 mm.

♂ Puparium (fig. 15) similar; but smaller, narrower and paler. Length 1 mm.

Adult ♀ clear pale purplish: oval. Pygidium (fig. 16) bluntly pointed: somewhat resembling that of *O. inusitatus*, but with a strongly cristate margin, three of the points on each side being larger and more prominent (possibly representing lobes). There is a moderately broad and deep excision at the extremity from which springs a dense brush of tapering hairs, the tips meeting in a point like a small paint-brush. No circumgenital glands. Numerous minute circular pores in the denser chitinous area. Six stout and moderately long paraphyses. Anal aperture near base of pygidium. Length 0.75 to 1.10 mm.

Adult ♂ very pale purplish pink: ocelli black. Legs, notal plates and genital sheath stained with reddish-yellow. Body rather slender: not depressed as in typical *Aspidiotus*. Abdomen without lateral flanges. Wings long and rather narrow. Genital sheath long and slender. Antenna 10-jointed: terminal joint with one knobbed hair at apex and two at side. First pair of feet with 4 digitules: second and third pairs with two only (1 on claw and 2 on tarsus). Total length 1 mm., of which the genital sheath occupies nearly one-third.

Puparia crowded on stems of a large Bamboo (*Gigantochloa aspera*), half embedded amongst the tomentose hairs around the nodes: attached by anterior extremity only. Peradeniya. May.

Allied to *O. inusitatus*, but easily distinguished by the terminal pencil of hairs and more cristate margin of pygidium.

(Note. It is probable that my *Chionaspis simplex* (Cocc. Ceyt. Part II, p. 160, Pl. LVII) is more nearly allied to this group, in spite

of its elongate form. The pygidial characters agree more with those of the genus *Odonaspis* than with *Chionaspis*.)

AONIDIA ECHINATA, n. sp. (Pl. J, figs. 17 to 19.)

♀ Puparium (fig. 17) dull reddish-brown (yellowish when immature), roughened with innumerable slender curved spines which are firmly attached to the nymphal pellicle and persist after treatment with caustic-potash. Circular; strongly convex. Larval pellicle deciduous,—pushed off during growth of nymphal pellicle. Diameter 0·35 mm.

♂ Puparium pale-yellowish. Oblong oval: secretory area flattish: pellicle strongly convex, situate at anterior extremity. Length 0·75 mm.

Adult ♀ (fig. 18) subcircular. Rostral apparatus very large and conspicuous. No parastigmatic glands. Pygidium (fig. 19) with six excurved thorn-like processes (? lobes). Diameter about 0·30 mm.

Adult ♂ not observed.

On *Hemicyclia sepiaria*. Anaradhapura. February.

The insects are thickly clustered on the under-surface of the leaves and are surrounded by a whitish bloom such as is noticeable around some species of *Fiorinia* and many *Aleurodidae*.

AONIDIA PUSILLA n. sp. (Pl. J, figs. 20, 21 %).

♀ Puparium (fig. 20) oval; yellow; obscured—in very fresh examples—by a thin covering of whitish secretion which, in older examples, persists only as a marginal fringe, leaving the yellow nymphal pellicle exposed. Larval pellicle deciduous. Nymphal pellicle with median area strongly convex and globose: cephalic area flattened and anteriorly produced: pygidial area similarly produced backwards and apparently articulated with the body of the scale to form a hinged operculum beneath which the young larvæ escape: margin of pygidium with ten narrow prominent lobes, and broad semilunar pores between them. Total length 0·50 mm.

♂ Puparium oval; somewhat larger, but much less convex: pellicle pale-yellow, occupying anterior two-thirds of puparium: secretory area whitish, translucent. Length 0·65 mm.

Adult ♀ broadly oval: pygidial area very slightly prominent. No parastigmatic or circumgenital glands. Margin of pygidium (fig. 21) with two small conical lobes, one on each side of a median clavate prominence which projects beyond them: margin immediately outside the lobes also projecting in three or four small rounded prominences. Some scattered circular pores. Anal orifice large and conspicuous. Length about 0·30 mm.

Adult ♂ not observed.

On upper surface of leaves of *Carissa spinarum*. Elephant Pass, Northern Province. March.

In the characters of the female puparium, this species approaches *Aonidia bullata*.

AONIDIA CRENULATA, Green.

Taken also at Elephant Pass, N. P., on *Memecylon*. In these example the number of floriate processes is not constant, sometimes amounting to a total of 30. A few delicate filiform ducts open on the margin. In one example a single conical lobe appears asymmetrically on one side.

AONIDIA PLANCHONIOIDES, Green.

Adult ♂ pale yellow: apodema reddish. Body flattish and broad,—especially at point of attachment of wings.

AONIDIA SPATULATA, Green. (Pl. J, fig. 22.)

Adult ♂ very pale violaceous: notal plates pale ochreous. Form broad, depressed. Genæ very prominent, lobulate. Foot with 4 digitules. Terminal joint of antenna (fig. 22) with knobbed hair at apex and a similar one on the side. Wings broadly rounded.

AONIDIA MESUÆ, Green. (Pl. J, fig. 23.)

Adult ♂ (fig. 23) almost circular in outline. Lateral margin of abdomen dilated. Colour creamy white: thoracic plates outlined with brownish-purple. Antennæ violaceous. Legs pale fulvous.

GYMNASPIS SPINOMARGINATA, n. sp. (Pl. J, figs. 24, 25.)

♀ Puparium bright yellow; smooth and polished; minute; circular very strongly convex (more than hemispherical): consisting of the inflated nymphal pellicle with or without an inconspicuous secretory extension. Larval pellicle deciduous. Diameter about 0·30 mm.

♂ Puparium not observed.

Adult ♀ (fig. 24) yellow: oval: strongly convex: divisions of segments very indistinct: margin closely set with tuberculate tubular spines connected with filiform ducts. Mouth-parts very large. Pygidium (fig. 25) with four narrow prominent lobes, each with a sharp tooth-like prominence on outer and inner edges. Compound spiniform squames (?) between and beyond the lobes. A submarginal series of broad semilunar pores—as in *Parlatoria*. No circumgenital or parastigmatic glands. Length about 0·25 mm.

Adult ♂ not known.

A minute and obscure species, occurring in small groups on under-surface of leaves of *Mesua ferrea*. Peradeniya. February.

Placed provisionally in the genus *Syngenaspis*: but possibly requiring a new genus for its reception. The general characters of the pygidium are suggestive of *Parlatoria* from which it differs in the absence of circumgenital glands. The remarkable marginal of tubular spines appear to be homologous with those found in some species of *Fiorinia*.

PARLATORIA PROTEUS, Curtis. (Pl. J, fig. 26.)

Aspidiotus proteus, Curtis. Gard. Chron., p. 676, (1843).

Diaspis parlatoris, Targ. Studii sul Cocc., p. 14, (1867).

Parlatoria proteus, Sign. Ann. Soc. Ent. Fr., (4), ix, p. 450, (1869).
(Sign. Essai sur les Cochen., p. 132.)

♀ Puparium broadly oval: flattish. Brownish-ochreous: opaque or semidiaphanous. Pellicles overlapping; situated at anterior extremity; occupying about half the expanse of the puparium. Length 1.50 mm.

♂ Puparium narrow, elongate. Pellicle yellow, with broad blackish or greenish median fascia. Secretory area pale ochreous. Length 1 mm.

Adult ♀ pale pinkish-purple. Broadly oval before gestation: shrinking after oviposition, until the breadth often exceeds the length. Pygidium broadly rounded: margin (fig. 26) with six prominent, conical, slightly floriate lobes. Squames broad and deeply finbricate, extending along margin of abdominal segments. Broad conspicuous lunate pores in the interspaces between the lobes and at close intervals along the margin beyond. Circumgenital glands in four groups with few orifices—5 to 7 in each group, upper group usually with the larger number. Length 0.50 to 0.75 mm.

Adult ♂ not observed.

On upper surface of leaves of an orchid (*Cymbidium bicolor*). Kandy. December. Also on both surfaces of a cultivated orchid at Watagoda. Examples on the undersurface (which in this plant is the more exposed) have the puparium darker and more opaque, whilst those on the other surface are semi-transparent and paler.

The species is almost universally distributed, being recorded from nearly every part of the world. In temperate regions it is found only upon plants under glass.

PARLATORIA PERGANDII, Comst., var. MYTILASPIFORMIS, Green.

Parlatoria pergandii, Comstock, Rep. U. S. Dep. Ag. 1880, p. 327.

Parlatoria mytilaspiformis, Green, Cocc. Ceyl., pt. ii, p. 164.

I now agree with Dr. Leonardi that this insect is merely an extremely elongate form of *pergandii*—a species which differs from *P. proteus* principally in the possession of a small sharply conical fourth lobe on each side of the pygidium, separated from the third lobe by three fimbriate squames. This fourth lobe is replaced—in *proteus*—by a fimbriate process.

In var. *mytilaspiformis*, the fourth lobe is minute and inconspicuous. In typical *pergandii* it is somewhat larger.

PARLATORIA PERGANDII, var. PHYLLANTHI, n. var. (Pl. J, fig. 27).

Differs from type in the coloration of the ♀ puparium (fig. 27), the secretory area of which is pale transparent ochreous, and the pellicles bright castaneous or brownish orange, each with a broad black median fascia. Length 1.50 mm.

♂ Puparium with the fascia on pellicle greenish. Length 1 mm.

Adult ♀ broadly oval. Pygidium as in type: fourth lobe small, about one-quarter the size of the other lobes. Length 0.60 mm.

Adult ♂ not observed.

On leaves of *Phyllanthus myrtifolius*. Peradeniya. May.

PARLATORIA (WEBSTERIELLA) ATALANTÆ, n. sp. (Pl. J, fig. 28).

♀ Puparium pale yellow: occupied almost completely by the large nymphal pellicle, with a very narrow fringe of whitish secretion. Flat-tish: oval, the larval pellicle slightly projecting in front. Posterior parts depressed, with an indistinct median carina. Length 1 mm. Breadth 0.75 mm.

♂ Puparium pale yellow, pellicle straw-coloured: narrow elongate, with parallel sides and rounded extremities. Posterior half depressed, with indistinct median carina. Length 0.80 mm.

Adult ♀ pale yellow. No parastigmatic glands. Pygidium (fig. 28) with six broad irregularly serrate lobes. Squames elongate, narrow, with extremities very obscurely fimbriate: two in each interspace between the lobes, and two or three beyond. A few similar squames on margin of last abdominal segment. Semi-lunar pores small, rather inconspicuous, three on each side. Near the base of pygidium, on each side, is a small rounded prominence homologous with the rudimentary fourth lobe occurring in some other species of *Parlatoria*. Anal aperture central. Circumgenital glands in four small

groups: upper laterals usually with 6, lower laterals with 4 orifices. Length 0.50 mm.

Adult ♂ not observed.

On undersurface of leaves of *Atalantia zeylanica*. Haragama, July.

Allied to *P. aonidiformis*: but differs in the more oval form of puparium and in its paler colour. The lobes of pygidium are much broader and less prominent.

FIORINIA BIDEENS, n. sp. (Pl. J, figs. 29,30).

♀ Puparium (fig. 29) consisting almost solely of the pellicles, with little or no marginal secretion. Elongate, narrowly fusiform, highly convex. Lateral margins of nymphal pellicle deeply and irregularly crenulate: posterior extremity constricted at base of pygidium which is slightly upturned. Pygidium of nymphal pellicle with two prominent divergent lanceolate lobes and a series of large lunate marginal pores. The larval pellicle covers fully half the puparium. Length 0.72 mm.

♂ Puparium snowy white, elongate, narrow: not carinate; considerably longer and much more conspicuous than that of the female. Length 1 mm.

Adult ♀ elongate, narrow. Rostral apparatus large and conspicuous. Antennæ close together: interantennal tubercle very small. Pygidium (fig. 30) with two parallel prominent lobes of the shape of incisor teeth. Two very long spiniform squames between the lobes, and two exterior to each lobe. Circumgenital glands with few orifices, in a more or less continuous arch. Length about 0.40 mm.

Adult ♂ not observed.

On undersurface of leaves of undetermined tree. Anaradhapura, February.

CHIONASPIS SUBCORTICALIS, n. sp. (Pl. K, fig. 31).

♀ Puparium white, or grey, or brownish from intermixture of particles of bark beneath which it rests. Surface rough, granular or powdery. Pellicles pale yellow, the nymphal one concealed beneath a layer of whitish secretion. Form usually irregular and contorted; dilated posteriorly: moderately convex. Length 2 to 2.50 mm.

♂ Puparium not observed.

Adult ♀ very pale yellowish or creamy white. Oblong: broadest across abdominal area: margins of abdominal segments moderately

produced. Spiracles without parastigmatic glands. Pygidium (fig. 31) with the median lobes large, prominent and very conspicuous, rounded or bluntly conical, broader than long, minutely serrate. Second lobes duplex, small, conical, inconspicuous. Third lobes obsolete or represented by serrate marginal prominences. Squames spiniform, increasing in size towards base of pygidium; none on first space, one on second, one on third, two on fourth, and four on basal space. Oval dorsal pores very large and conspicuous, the innermost series represented only by one or two marginal pores. Circumgenital glands in five groups, with numerous orifices: median group 10 to 12; upper laterals 25 to 26; lower laterals 20 to 27. Anal aperture close to median group of glands. Length 1 to 1.50 mm. Breadth 0.50 to 0.90 mm.

Eggs bright pale orange.

Beneath loose bark on stems of "Jak" (*Artocarpus integrifolia*) and other trees. Peradeniya; Matale.

Near *Ch. polygoni*: but differing in the larger median lobes, in the obsolescent third pair of lobes, and in the greater number of dorsal pores.

CHIONASPIS STROBILANTHI, n. sp. (Pl. K, fig. 32.)

♀ Puparium snowy white, or with a faint creamy tinge. Dense and opaque. Surface with a few irregular raised lines, as in *Ch. varicosa*. Ventral scale well developed. Pellicles very pale yellow. Form oblong, strongly dilated posteriorly. Length 3 mm. Breadth 1.50 to 2 mm.

♂ Puparium white; obscurely tricarinate. Densely covered with curling silky filaments. Length 1.50 mm.

Adult ♀ bright yellow. Of normal form: abdominal segments scarcely produced. Margin of thorax and abdomen with many conspicuous oval pores. Antenna consisting of a prominent truncate tubercle, with several short hairs at extremity and a stout long curved hair from the side. Parastigmatic glands at orifices of anterior spiracles only. Pygidium (fig. 32) with conspicuous median incision; the sides of the cleft occupied by the median lobes which are large, united at the base, widely divergent, the free edge minutely serrate. Second lobes minute, duplex, inconspicuous. Third lobes represented only by small marginal prominences. Squames moderately stout, increasing in size towards base of pygidium. Oval dorsal pores large and conspicuous, in

linear series. Circumgenital glands in five groups, with moderately numerous orifices. Length 1 to 1.25 mm. Breadth 0.60 mm.

Adult ♂ not known.

Eggs numerous; bright yellow.

On *Strobilanthus*, sp. Haputale. February.

Allied to *Ch. megaloba*, from which it differs in the considerably larger size, in the narrower mesal lobes, and in the presence of conspicuous oval pores on the margins of the thorax.

CHIONASPIS CORONIFERA, n. sp. (Pl. K, figs. 33, 34.)

♀ puparium white, sometimes tinged with ochreous: pellicles reddish. Strongly convex, the sides sloping up and forming a median longitudinal rounded ridge,—the form probably accentuated by the situation of the puparium on the extreme margin of the leaf. Length 2 mm.

♂ puparium white: distinctly tricarinate: pellicle pale yellow. Length 1.50 mm.

Adult ♀ after gestation reddish: densely chitinous, with exception of penultimate segment. Thoracic area strongly convex, the posterior dorsal area overhanging the abdomen. Early adult not densely chitinous, and of a paler colour. Rudimentary antennæ (fig. 33) of remarkable form: each consisting of a chitinous ring bearing from four to six stout spines and a central longish curved stout bristle. Behind each antenna is an oval translucent space. Other similar translucent spaces are scattered over the cephalo-thoracic area. Margins of abdominal and post-thoracic segments with numerous oval pores (obscured in the more densely chitinous examples). Pygidium (fig. 34) with large conspicuous oval dorsal pores, in more or less definite series. No circumgenital glands. Marginal squames spiniform, stout. Lobes bluntly lanceolate, small, pale and very inconspicuous: set back on the ventral surface and scarcely projecting beyond the margin. Median pair simple: second pair duplex: third pair apparently simple. In the denser examples, the dorsal area of the pygidium has some large clear oval spaces (distinct from the dorsal pores). Length 0.75 to 1.50 mm.

Adult ♂ not observed.

On leaves of undetermined tree. Galgamuwa, N. W. P. August.

The female puparia are attached to the extreme margins of the leaves. Male puparia grouped on under surface.

CHIONASPIS CINNAMOMI, n. sp. (Pl. K, figs. 35, 36.)

♀ puparium reddish ochreous, usually with a broad median longitudinal brownish fascia. Form elongate, narrow : secretory area only slightly dilated : flattish, with a more or less distinct median longitudinal ridge. Length 2 to 2.75 mm. Breadth about 0.75 mm.

♂ puparium not observed.

Adult ♀ (fig. 35) elongate, narrow; the unusual form being due to extension of the thoracic parts which occupy nearly three-quarters of the entire length. The second pair of spiracles are situated at the extreme hinder border of the meta-thorax. Pygidium (fig. 36) pointed. Median lobes prominent, contiguous, the inner edge longest, the free edge minutely serrate and sloping evenly to the margin. Other lobes obsolete. On each side, immediately exterior to the medium pair of lobes, is an elongate clavate chitinous paraphysis. Margin of pygidium irregularly indented. Squames spiniform, stout. Spines rather long. Some conspicuous oval pores on margin, but none on the discal area. No circumgenital glands. Three or four minute circular pores on each side of anal orifice which is approximately central. Length 1 to 1.50 mm. Breadth about 0.30 mm.

On upper surface of leaves of *Cinnamomum*. Pundaluoya.

In the absence of the male scale, the generic position of this species is somewhat uncertain. The form of the median lobes suggests affinities with the *Hemichionaspis* group.

CHIONASPIS THEÆ, Mask., var. CEYLONICA, n. var.

Maskell's original figures and description of the adult female are not sufficiently minute for accurate determination. But a study of specimens collected by Dr. (now Sir George) Watt, near Kurseong, India, agree more closely with Maskell's type, in the form of the puparium (which is broadly dilated behind)—than with the Ceylon form (which is very narrow and elongate). The Indian examples also show a distinct second lateral lobe which is entirely wanting in examples from Ceylon. I must therefore consider the latter a well-marked variety for which I now propose the name *ceylonica*.

LEUGASPIS COCKERELLI, (de Charmoy). (Pl. K, figs. 37 to 40.)

Fiorinia cockerelli, de Charm., Proc. Soc. Amic. Scien.,
p. 33, (1899).

♀ puparium (fig. 37) elongate, very narrow, almost linear, tapering to a point at each extremity. Moderately convex, with a well-defined

sharp median ridge. Puparium almost completely occupied by the large nymphal pellicle which is of a dark reddish-brown colour. Secretory area thin and diaphanous, except along the median ridge, where it is thickened and forms a white crest. There is a narrow secretory extension in front of the larval pellicle, and an abruptly narrowed extension at the posterior extremity of the puparium. Ventral scale very thin and delicate: easily ruptured. Larval pellicle long and narrow. Total length of puparium 2·50 mm. Length of larval pellicle 0·75 mm. : nymphal pellicle 1·60 to 1·75 mm. Greatest breadth of puparium 0·50 mm.

♂ Puparium not observed.

Adult ♀ (fig. 38) elongate narrow: broadest across abdominal area. Pale violaceous, tinged with red. There is an almost complete series of coarsely serrate processes—marginal on the pygidium, but carried inwards along the ventral surface of the body, gradually increasing its distance from the actual margin and closely embracing the rostrum. Rudimentary antennæ close to rostrum. A small stout thorn-like spine in front of and exterior to each antenna. Posterior margin of pygidium (fig. 39) with four narrow prominent sharply pointed lobes, each with a more or less conspicuous smaller point on its lateral edges. Squames long, narrowed at base, dilated and deeply fimbriate at extremity: two in each interspace and three exterior to the lobes, beyond which are the serrate processes described above. Dorsal pores minute and inconspicuous. Circumgenital glands in nine groups, four supplementary groups being anterior to the normal five—(see fig. 38). Length 0·75 mm.

Margin of nymphal pellicle (fig. 40) with four tricuspid lobes and broad deeply fimbriate squames. A series of broad lunate marginal pores.

Eggs violaceous.

On *Dracæna cantleyi* and *Pritchardia grandis*, in the plant-houses, Royal Botanic Gardens, Peradeniya. On the *Pritchardia*, the scales—though numerous—are very inconspicuous, being ranged along the prominent ridges of the leaf, near the base, where they resemble small adpressed scaly hairs.

Originally described from Mauritius, under the name of *Fiorinia cockerelli*, de Charмой. The marginal fringe and supplementary gland

groups are characters that suggest its more proper inclusion in the genus *Leucaspis*.

EXPLANATION OF PLATES H to K.

Plate H.

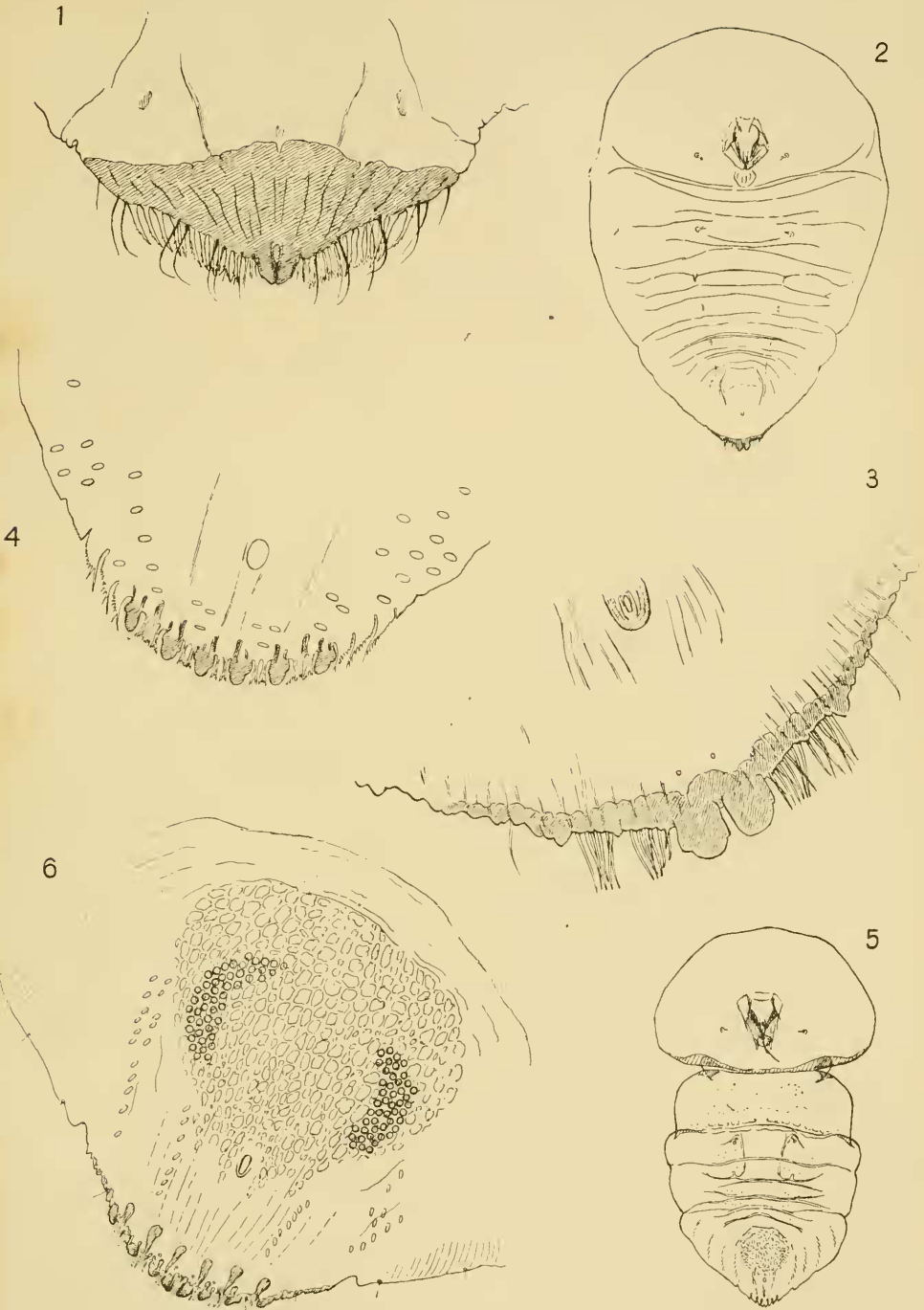
- Fig. 1 *Aspidiotus longispinus*; pygidium of adult female.
 „ 2 „ *cuculus*; adult female, ventral view.
 „ 3 „ „; pygidium of adult female.
 „ 4 „ *pedronis*; pygidium of adult female.
 „ 5 „ *maleollus*; adult female, ventral view.
 „ 6 „ „; pygidium of adult female.

Plate I.

- Fig. 7 *Aspidiotus cistuloides*; puparium of female.
 „ 8 „ „; pygidium of adult female.
 „ 9 „ *quadriclavatus*; pygidium of adult female.
 „ 10 „ *taprobanus*; pygidium of adult female.
 „ 11 „ *phyllanthi*; pygidium of adult female.
 „ 12 „ *occultus* v. *elongatus*; galls of female.
 „ 13 „ „; pygidium of adult female.
 „ 14 *Odonaspis penicillata*; puparium of female.
 „ 15 „ „; male puparium.
 „ 16 „ „; pygidium of adult female.

Plate J.

- Fig. 17 *Aonidia echinata*; puparium of female.
 „ 18 „ „; adult female, ventral view.
 „ 19 „ „; pygidium of adult female.
 „ 20 „ *pusilla*; puparium of female.
 „ 21 „ „; pygidium of adult female.
 „ 22 „ *spatulata*; terminal joint of male antenna.
 „ 23 „ *mesuae*; adult male, dorsal view.
 „ 24 *Gymnaspis spinomarginata*; adult female, ventral view.
 „ 25 „ „; margin of pygidium.
 „ 26 *Parlatoria proteus*; margin of female pygidium.
 „ 27 „ *pergandii* v. *phyllanthi*; puparium of female.
 „ 28 „ *atalantice*; pygidium of adult female.
 „ 29 *Fiorinia bidens*; female puparium, ventro-lateral view.
 „ 30 „ „; pygidium of adult female.



E. E. Green del.

CEYLON COCCIDÆ